SIEMENS

RUGGEDCOM RS900W

Installation Guide

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Preface

This guide describes the RUGGEDCOM RS900W. It describes the major features of the device, installation, commissioning and important technical specifications.

It is intended for use by network technical support personnel who are responsible for the installation, commissioning and maintenance of the device. It is also recommended for use by network and system planners, system programmers, and line technicians.

Alerts

The following types of alerts are used when necessary to highlight important information.

DANGER!
DANGER alerts describe imminently hazardous situations that, if not avoided, will result in death or serious injury.

WARNING!
WARNING alerts describe hazardous situations that, if not avoided, may result in serious injury and/or equipment damage.

CAUTION!
CAUTION alerts describe hazardous situations that, if not avoided, may result in equipment damage.

IMPORTANT!
IMPORTANT alerts provide important information that should be known before performing a procedure or step, or using a feature.

NOTE
NOTE alerts provide additional information, such as facts, tips and details.

Related Documents

Other documents that may be of interest include:

- *ROS User Guide for RS900LW/RS930LW*

Accessing Documentation

The latest Hardware Installation Guides and Software User Guides for most RUGGEDCOM products are available online at www.siemens.com/ruggedcom.

For any questions about the documentation or for assistance finding a specific document, contact a Siemens sales representative.

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- **Telephone**

  Call a local hotline center to submit a Support Request (SR). To locate a local hotline center, visit http://www.automation.siemens.com/mcms/aspa-db/en/automation-technology/Pages/default.aspx.

- **Mobile App**

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  - Submit SRs or check on the status of an existing SR
  - Find and contact a local contact person
  - Ask questions or share knowledge with fellow Siemens customers and the support community via the forum
  - And much more...

1 Introduction

The RUGGEDCOM RS900W is an industrially hardened Ethernet switch which integrates an IEEE 802.11b/g Wireless Access Point, with a fully managed wired eight-Port Ethernet switch providing six Fast Ethernet copper only ports and two optional copper or fiber ports. With the installation of the RS900W wireless access point, a network designer will achieve the integration of wired and wireless networks. The RS900W can be configured as an access, client or bridge device.

Designed to operate reliably in harsh industrial environments the RS900W provides a high level of immunity to electromagnetic interference and heavy electrical surges typical of environments found in electric utility substations, factory floors or in curb-side traffic control cabinets. An operating temperature range of -40 to 85 °C (-40 to 185 °F) coupled with hazardous location certification, optional conformal coating and a galvanized steel enclosure allows the RS900W to be placed in almost any location.

The RS900W functions as a standalone IEEE 802.11b/g access point for wireless clients providing wireless data rates of up to 54 Mbps. All wireless communications are protected by the very latest *robust security networks* features including strong encryption protocols using WPA with TKIP and even WPA2/802.11i with AES support. Static authentication support is provided by WPA-PSK. For additional centralized control, the RS900W also supports IEEE 802.1X/RADIUS for wireless user traffic and distributing dynamic encryption keys.

The following sections provide more information about the RS900W:

- Section 1.1, “Feature Highlights”
- Section 1.2, “Ports, Controls and Indicator LEDs”

Section 1.1

Feature Highlights

Ethernet Ports

- Industry standard fiber optical connectors: LC, SC, ST, MTRJ
- Six fast Ethernet ports (10/100Base-TX)
- Optional: additional two fast Ethernet ports (10/100Base-TX or 100Base-FX)

Cyber Security

- WPA (Wi-Fi Protected Access) with TKIP for enhanced security and encryption
- WPA2/802.11i with CCMP for robust security and 128-bit AES encryption
- IEEE 802.1X/RADIUS using EAP-PEAP for secure *enterprise class* authentication configuration
- Pre-shared Key Mode (PSK) for *personal* mode authentication configuration
- Multi-level user passwords
- SSH/SSL (128-bit encryption)
- Enable/disable ports, MAC based port security
- Port based network access control (802.1x)
- VLAN (802.1Q) to segregate and secure network traffic
- RADIUS centralized password management

- SNMPv3 authentication and 56-bit encryption

Rated for Reliability in Harsh Environments

- Immunity to EMI and heavy electrical surges
  - Meets IEEE 1613 class 1 (electric utility substations)
  - Exceeds IEC 61850-3 (electric utility substations)
  - Exceeds IEC 61800-3 (variable speed drive systems)
  - Exceeds IEC 61000-6-2 (generic industrial)
  - Exceeds NEMA TS-2 (traffic control equipment)
- Hazardous Location Certification: Class 1 Division 2
- -40 to 85 °C (-40 to 185 °F) operating temperature (no fans)
- 20 AWG galvanized steel enclosure
- DIN or panel mounting options provide secure mechanical reliability
- Conformal coated printed circuit boards (optional)

Management Tools

- Web-based, Telnet, CLI management interfaces
- SNMP v1/v2/v3 (56-bit encryption)
- Remote Monitoring (RMON)
- Rich set of diagnostics with logging and alarms

Universal Power Supply Options

- Fully integrated power supply
- Universal high-voltage range: 88-300 VDC or 85-264 VAC
- Dual low-voltage DC inputs: 24 VDC (10-36 VDC) or 48 VDC (36-72 VDC)
- Terminal blocks for reliable maintenance free connections
- CSA/UL 60950-1 safety approved to 85 °C (185 °F)

Section 1.2

Ports, Controls and Indicator LEDs

The RS900W features various ports, controls and indicator LEDs on the front panel for configuring and troubleshooting the device.

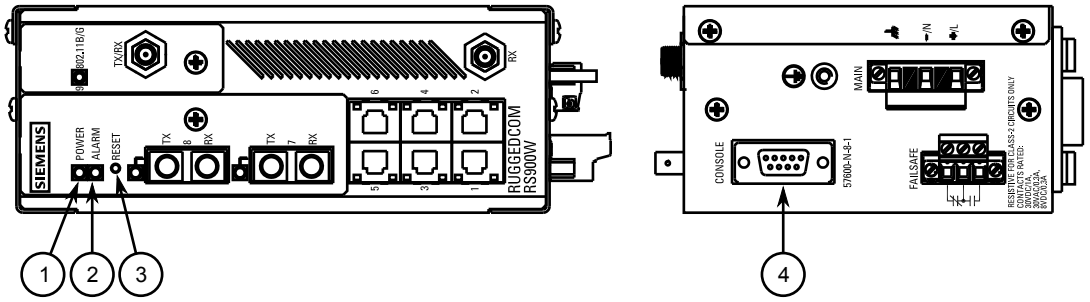

Figure 1: Front Panel

1. Power Indicator LEDs **2.** Alarm Indicator LED **3.** Reset Button **4.** RS232 Serial Console Port

Power Indicator LEDs	The power indicator LED illuminates when power is being supplied to the device.
Alarm Indicator LED	The alarm indicator LED illuminates when an alarm condition exists.
Reset Button	The reset button shuts down and restarts the device.
RS232 Serial Console Port	This port is for interfacing directly with the device and accessing initial management functions.

2 Installing the Device

The following sections describe how to install the device, including mounting the device, installing/removing modules, connecting power, and connecting the device to the network.

WARNING!
Radiation hazard – risk of serious personal injury. This product contains a laser system and is classified as a CLASS 1 LASER PRODUCT. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

DANGER!
Electrocution hazard – risk of serious personal injury and/or damage to equipment. Before performing any maintenance tasks, make sure all power to the device has been disconnected and wait approximately two minutes for any remaining energy to dissipate.

IMPORTANT!
This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void.

Changes or modifications not expressly approved by Siemens Canada Ltd. could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the equipment.

IMPORTANT!
This product should be installed in a restricted access location where access can only be gained by authorized personnel who have been informed of the restrictions and any precautions that must be taken. Access must only be possible through the use of a tool, lock and key, or other means of security, and controlled by the authority responsible for the location.

- Section 2.1, “Mounting the Device”
- Section 2.2, “Connecting Power”
- Section 2.3, “Connecting the Failsafe Alarm Relay”
- Section 2.4, “Connecting to the Device”
- Section 2.5, “Cabling Recommendations”

Section 2.1

Mounting the Device

The RS900W is designed for maximum mounting and display flexibility. It can be equipped with connectors that allow it to be installed in a 35 mm (1.4 in) DIN rail or directly on a panel.

NOTE
For detailed dimensions of the device with either DIN rail or panel hardware installed, refer to Chapter 5, Dimension Drawings.

The following sections describe the various methods of mounting the device:

- Section 2.1.1, “Mounting the Device on a DIN Rail”
- Section 2.1.2, “Mounting the Device to a Panel”

Section 2.1.1

Mounting the Device on a DIN Rail

For DIN rail installations, the RS900W can be equipped with a DIN rail bracket pre-installed on the back of the chassis. The bracket allows the device to be slid onto a standard 35 mm (1.4 in) DIN rail.

To mount the device to a DIN rail, do the following:

1. Align the slot in the bracket with the DIN rail.

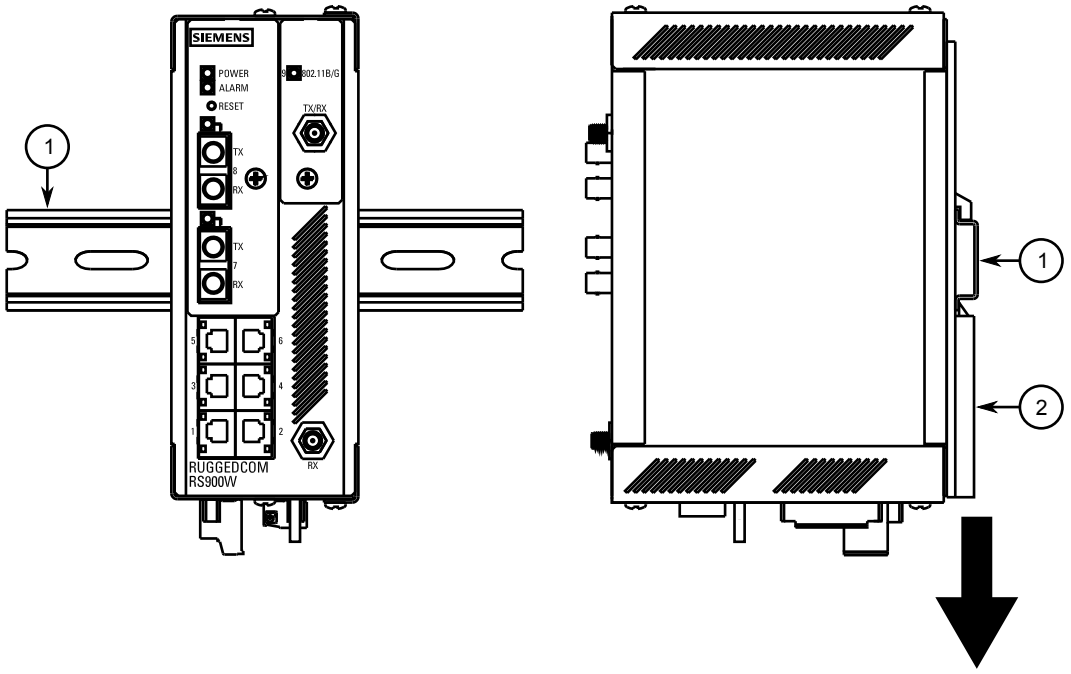

Figure 2: DIN Rail Mounting

1. DIN Rail **2.** DIN Rail Bracket

2. Pull the release on the bracket down and slide the device onto the DIN rail. Let go of the release to lock the device in position.

Section 2.1.2

Mounting the Device to a Panel

For panel installations, the RS900W can be equipped with panel adapters pre-installed on the top and bottom of the chassis. The adapters allow the device to be attached to a panel using screws.

To mount the device to a panel, do the following:

1. Place the device against the panel and align the adapters with the mounting holes.

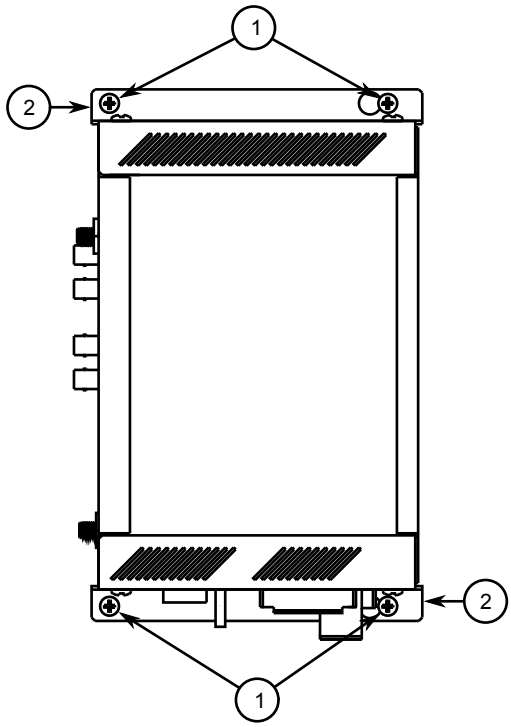

Figure 3: Panel Mounting

1. Screw **2.** Panel Adaptor

2. Install the supplied screws to secure the adapters to the panel.

Section 2.2

Connecting Power

The RS900W supports a single integrated high AC/DC or low DC power supply

IMPORTANT!

- *For 110/230 VAC rated equipment, an appropriately rated AC circuit breaker must be installed.*
- *For 125/250 VDC rated equipment, an appropriately rated DC circuit breaker must be installed.*
- *Use only #16 gage copper wiring when connecting terminal blocks.*
- *Equipment must be installed according to applicable local wiring codes and standards.*
- *All line-to-ground transient energy is shunted to the Surge Ground terminal. In cases where users require the inputs to be isolated from ground, remove the ground braid between Surge and Chassis Ground. Note that all line-to-ground transient protection circuitry will be disabled.*

IMPORTANT!
Use only #16 gage copper wiring when connecting terminal blocks.

The following sections describe how to connect power to the device:

- Section 2.2.1, “Connecting High AC/DC Power”
- Section 2.2.2, “Connecting Low DC Power”

Section 2.2.1
Connecting High AC/DC Power

To connect a high AC/DC power supply to the device, do the following:

CAUTION!
Electrical hazard – risk of damage to equipment. Do not connect AC power cables to terminals for DC power. Damage to the power supply may occur.

CAUTION!
Electrical hazard – risk of damage to equipment. Before testing the dielectric strength (HIPOT) in the field, remove the braided ground cable connected to the surge ground terminal and chassis ground. This cable connects transient suppression circuitry to chassis ground and must be removed in order to avoid damage to transient suppression circuitry during testing.

1. Connect the positive wire from the power source to the positive/live (+/L) terminal on the terminal block.

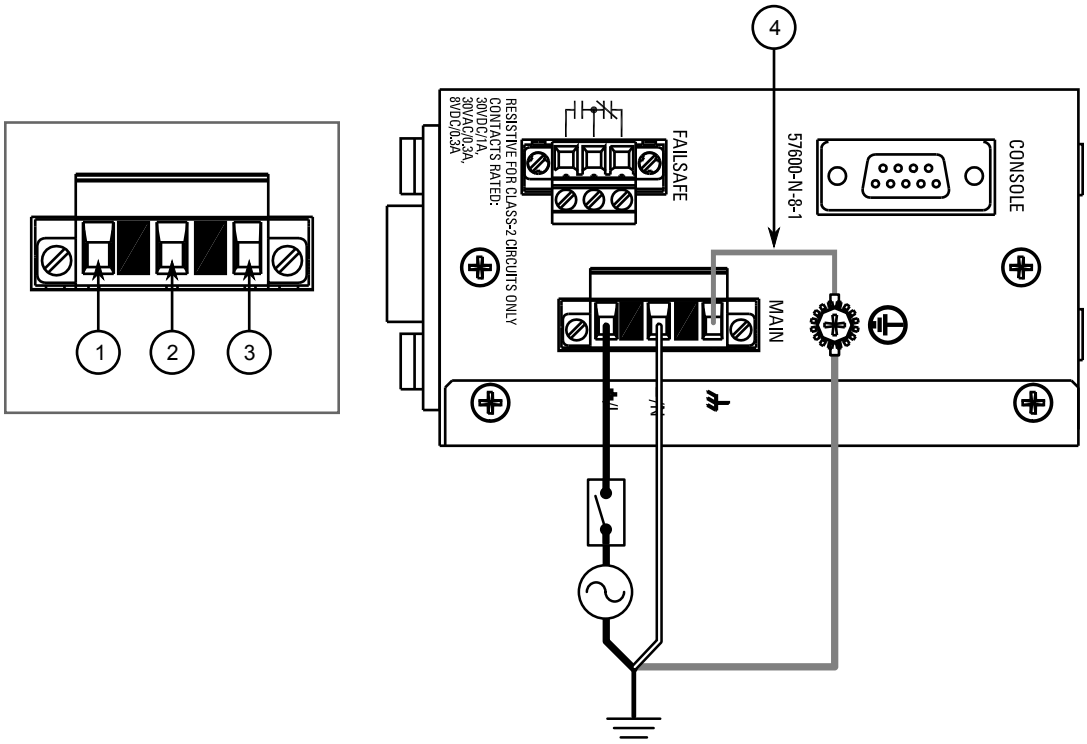

Figure 4: Terminal Block Wiring

1. Positive/Live (+/L) Terminal **2.** Negative/Neutral (-/N) Terminal **3.** Surge Ground Terminal **4.** Braided Ground Cable

2. Connect the negative wire from the power source to the negative/neutral (-/N) terminal on the terminal block.
3. Using a braided wire or other appropriate grounding wire, connect the surge ground terminal to the chassis ground connection. The surge ground terminal is used as the ground conductor for all surge and transient suppression circuitry internal to the unit.
4. Connect the ground terminal on the power source to the chassis ground terminal on the device.

Section 2.2.2

Connecting Low DC Power

The device supports a single low DC power supply with dual power supply inputs. The use of both power supply inputs is recommended to provide redundancy and load balancing.

To connect a low DC power supply to the device, do the following:

1. Connect the positive wire from the power source to the positive terminal on the terminal block.

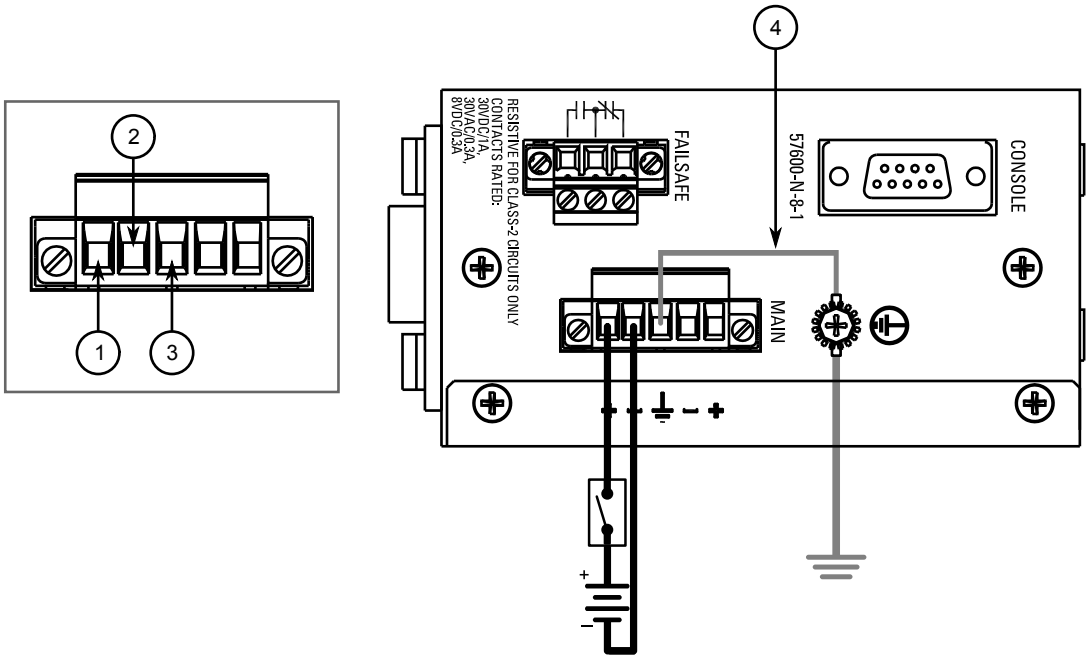

Figure 5: Terminal Block Wiring - Single DC Power Supply Inputs

1. Positive Terminal **2.** Negative Terminal **3.** Surge Ground Terminal **4.** Braided Ground Cable

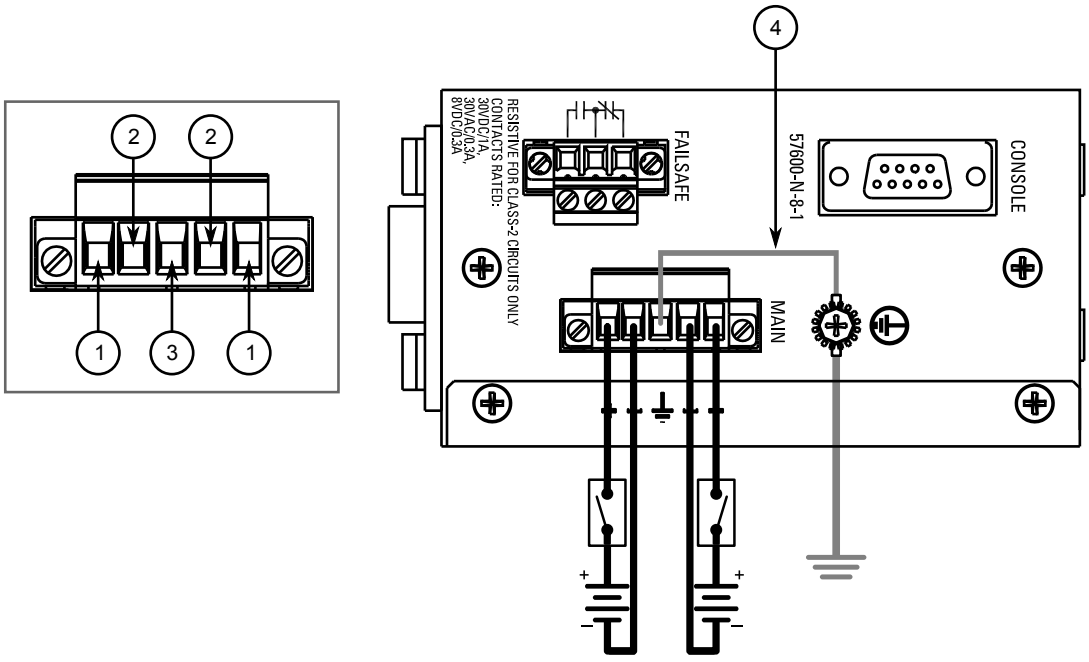

Figure 6: Terminal Block Wiring - Dual DC Power Supply Inputs

1. Positive Terminal **2.** Negative Terminal **3.** Surge Ground Terminal **4.** Braided Ground Cable

2. Connect the negative wire from the power source to the negative terminal on the terminal block.
3. Using a braided wire or other appropriate grounding wire, connect the surge ground terminal to the chassis ground connection. The surge ground terminal is used as the ground conductor for all surge and transient suppression circuitry internal to the unit.
4. Connect the ground terminal on the power source to the chassis ground terminal on the device.

Section 2.3
Connecting the Failsafe Alarm Relay

The failsafe relay can be configured to latch based on alarm conditions. The NO (Normally Open) contact is closed when the unit is powered and there are no active alarms. If the device is not powered or if an active alarm is configured, the relay opens the NO contact and closes the NC (Normally Closed) contact.

NOTE
Control of the failsafe relay output is configurable through ROS. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the ROS User Guide for the RS900W.

The following shows the proper relay connections.

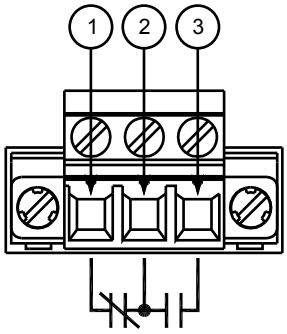

Figure 7: Failsafe Alarm Relay Wiring

1. Normally Closed **2.** Common **3.** Normally Open

Section 2.4
Connecting to the Device

The following describes the various methods for accessing the ROS console and Web interfaces on the device. For more detailed instructions, refer to the *ROS User Guide* for the RS900W.

Serial Console Port

Connect a PC or terminal directly to the serial console port to access the boot-time control and ROS console interface.

IMPORTANT!
The serial console port is intended to be used only as temporary connections during initial configuration or troubleshooting.

The serial console port implements RS232 DCE (Data Communication Equipment) on a DB9 connector. The following is the pin-out for the port:

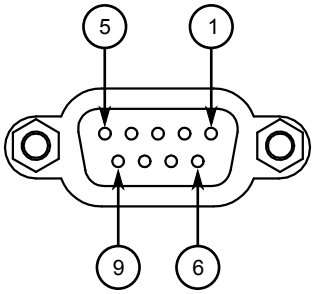

Figure 8: Serial DB9 Console Port

Pin	Name	Description
1	DCD	Data Carrier Detect
2	RX	Receive Data
3	TX	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear To Send
9	Reserved (Do Not Connect)	

Communication Ports

Connect any of the available Ethernet ports on the device to a management switch and access the ROS console and Web interfaces via the device's IP address. For more information about available ports, refer to Chapter 3, *Communication Ports*.

Section 2.5

Cabling Recommendations

Siemens does not recommend the use of copper cabling of any length for critical, real-time substation automation applications. All copper Ethernet ports on RUGGEDCOM products include transient suppression circuitry to protect against damage from electrical transients and conform with IEC 61850-3 and IEEE 1613 Class 1 standards. This means that during a transient electrical event, communications errors or interruptions may occur, but recovery is automatic.

Siemens also does not recommend using copper Ethernet ports to interface with devices in the field across distances that could produce high levels of ground potential rise (i.e. greater than 2500 V), during line-to-ground fault conditions.

3 Communication Ports

The RS900W can be equipped with various types of communication ports to enhance its abilities and performance. To determine which ports are equipped on the device, refer to the factory data file available through ROS. For more information on how to access the factory data file, refer to the *ROS User Guide* for the RS900W.

Each communication port type has a specific place in the RS900W chassis.

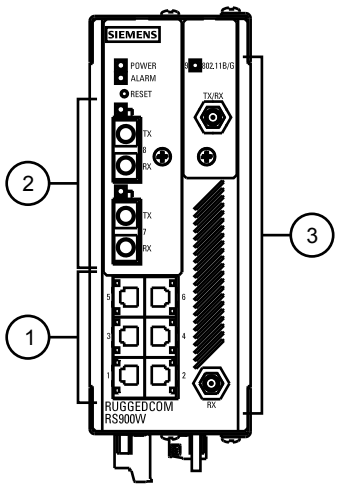

Figure 9: Port Assignment

1. Ports 1 to 6 **2.** Ports 7 to 8 **3.** Port 9

Port	Type
1 to 6	Fast Ethernet Ports (10/100Base-TX)
7 to 8	Fast Ethernet Ports (10/100Base-TX or 10/100Base-FX)
9	Wireless Antennas

The following sections describe the available ports:

- Section 3.1, “Copper Ethernet Ports”
- Section 3.2, “Fiber Optic Ethernet Ports”
- Section 3.3, “Wireless Ethernet Ports”

Section 3.1

Copper Ethernet Ports

The RS900W supports several 10/100Base-TX Ethernet ports that allow connection to standard Category 5 (CAT-5) unshielded twisted-pair (UTP) cables with RJ45 male connectors. The RJ45 receptacles are directly connected to the chassis ground on the device and can accept CAT-5 shielded twisted-pair (STP) cables.

WARNING!
Electric shock hazard – risk of serious personal injury and/or equipment interference. If shielded cables are used, make sure the shielded cables do not form a ground loop via the shield wire and the RJ45 receptacles at either end. Ground loops can cause excessive noise and interference, but more importantly, create a potential shock hazard that can result in serious injury.

Each port features a **Speed** and **Link** LED that indicates the state of the port.

LED	State	Description
Speed	Yellow	The port is operating at 100 Mbps
	Off	The port is operating at 10 Mbps
Link	Yellow (Solid)	Link established
	Yellow (Blinking)	Link activity
	Off	No link detected

The following is the pin-out for the RJ45 male connectors:

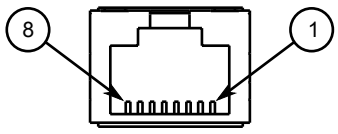

Figure 10: RJ45 Ethernet Port Pin Configuration

Pin	Name	Description
1	RX+	Receive Data+
2	RX-	Receive Data-
3	TX+	Transmit Data+
4	Reserved (Do Not Connect)	
5	Reserved (Do Not Connect)	
6	TX-	Transmit Data-
7	Reserved (Do Not Connect)	
8	Reserved (Do Not Connect)	

For specifications on the available copper Ethernet ports, refer to Section 4.3, “Copper Ethernet Port Specifications”.

Section 3.2
Fiber Optic Ethernet Ports

Fiber optic Ethernet ports are available with either MTRJ (Mechanical Transfer Registered Jack), LC (Lucent Connector), SC (Standard or Subscriber Connector) or ST (Straight Tip) connectors. Make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

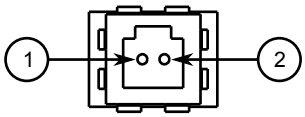

Figure 11: MTRJ Port

1. Tx Connector **2.** Rx Connector

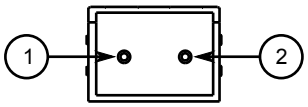

Figure 12: LC Port

1. Tx Connector **2.** Rx Connector

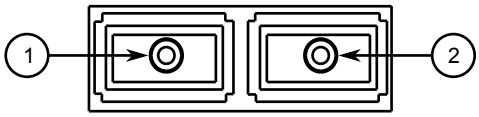

Figure 13: SC Port

1. Tx Connector **2.** Rx Connector

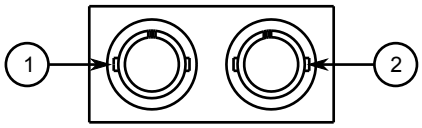

Figure 14: ST Port

1. Tx Connector **2.** Rx Connector

For specifications on the available fiber optic Ethernet ports, refer to Section 4.5, “Fiber Optic Ethernet Port Specifications”.

Section 3.3

Wireless Ethernet Ports

The following ports can be ordered with the RS900W:

Wireless Standard	Domain
IEEE 802.11	US (North America)
IEEE 802.11	EU (European Union)
IEEE 802.11	AU (Australia)
IEEE 802.11	IN (India)

NOTE

For an introduction to IEEE 802.11 Ethernet-based wireless technologies, refer to the RUGGEDCOM Wireless Guide available from www.siemens.com/ruggedcom.

For more information about the available wireless Ethernet ports, refer to Section 4.6, “Wireless Ethernet Port Specifications”.

4 Technical Specifications

The following sections provide important technical specifications related to the device and available modules:

- Section 4.1, “Power Supply Specifications”
- Section 4.2, “Failsafe Relay Specifications”
- Section 4.3, “Copper Ethernet Port Specifications”
- Section 4.4, “10Base-FL Fiber Optic Ethernet Port Specifications”
- Section 4.5, “Fiber Optic Ethernet Port Specifications”
- Section 4.6, “Wireless Ethernet Port Specifications”
- Section 4.7, “Operating Environment”
- Section 4.8, “Mechanical Specifications”

Section 4.1

Power Supply Specifications

Power Supply Type	Input Range		Internal Fuse Rating[ab]	Isolation	Maximum Power Consumption[c]
	Minimum	Maximum			
HI	88 VDC	300 VDC	3.15 A(T)	4 kVAC	10 W
	85 VAC	264 VAC		5.5 kVDC	
24	10 VDC	36 VDC		1.5 kVDC	
48	36 VDC	72 VDC		1.5 kVDC	

[a] *(F) denotes fast-acting fuse*

[b] *(T) denotes time-delay fuse.*

[c] *Power consumption varies based on configuration.*

Section 4.2

Failsafe Relay Specifications

Maximum Switching Voltage	Rated Switching Current	Isolation
30 VDC	2 A, 60 W	1500 V_{rms} for 1 minute
125 VDC	0.24 A, 30 W	
125 VAC	0.5 A, 62.5 W	
220 VDC	0.24 A, 60 W	
250 VAC	0.25 A, 62.5 W	

Section 4.3
Copper Ethernet Port Specifications

The following details the specifications for copper Ethernet ports that can be ordered with the RS900W.

Speed[d]	Connector	Duplex[d]	Cable Type[e]	Wiring Standard[f]	Maximum Distance[g]	Isolation[h]
10/100TX	RJ45	FDX/HDX	> Category 5	TIA/EIA T568A/B	100 m (328 ft)	1.5 kV

[d] *Auto-negotiating.*

[e] *Shielded or unshielded.*

[f] *Auto-crossover and auto-polarity.*

[g] *Typical distance. Dependent on the number of connectors and splices.*

[h] *RMS 1 minute.*

Section 4.4
10Base-FL Fiber Optic Ethernet Port Specifications

Mode	Connector Type	Cable Type (µm)	Tx λ (nm)[i]	Tx min (dBm)	Tx max (dBm)	Rx Sensitivity (dBm)	Rx Saturation (dBm)	Distance (km)[i]	Power Budget (dB)
MM	ST	62.5/125	850	-16	-9	-34	-11.2	2	18
		50/125		-19.8	-12.8				14.2

[i] *Typical.*

Section 4.5
Fiber Optic Ethernet Port Specifications

The following details the specifications for fiber Ethernet ports that can be ordered with the RS900W.

NOTE

- *All optical power numbers are listed as dBm averages. To convert from average to peak add 3 dBm. To convert from peak to average, subtract 3 dBm.*
- *Maximum segment length is greatly dependent on factors such as fiber quality, and the number of patches and splices. Consult a Siemens sales associate when determining maximum segment distances.*

Mode	Connector Type	Cable Type (µm)	Tx λ (nm)[j]	Tx min. (dBm)	Tx max. (dBm)	Rx Sensitivity (dBm)	Rx Saturation (dBm)	Distance (km)[j]	Power Budget (dB)
MM	ST	62.5/125	1300	-19	-14	-31	-14	2	12
		50/125		-22.5					8.5

Mode	Connector Type	Cable Type (µm)	Tx λ (nm)[j]	Tx min. (dBm)	Tx max. (dBm)	Rx Sensitivity (dBm)	Rx Saturation (dBm)	Distance (km)[j]	Power Budget (dB)
MM	SC	62.5/125	1300	-19	-14	-31	-14	2	12
		50/125		-22.5					8.5
MM	MTRJ	62.5/125	1300	-19	-14	-31	-14	2	12
SM	ST	9/125	1300	-15	-8	-32	-3	20	17
SM	SC	9/125	1300	-15	-8	-31	-7	20	16
SM	LC	9/125	1300	-15	-8	-34	-7	20	19
SM	SC	9/125	1300	-5	0	-34	-3	50	29
SM	LC	9/125	1300	-5	0	-35	3	50	30
SM	SC	9/125	1300	0	5	-37	0	90	37
SM	LC	9/125	1300	0	5	-37	0	90	37
MM	LC	50/125	1300	-22.5	-14	-31	-14	2	8.5

[j] *Typical.*

Section 4.6

Wireless Ethernet Port Specifications

The following sections detail specifications for wireless Ethernet ports that can be equipped on the RS900W:

- Section 4.6.1, “Supported Wireless Standards”
- Section 4.6.2, “Radio Characteristics”
- Section 4.6.3, “Channel Allocations for IEEE 802.11b/g”

Section 4.6.1

Supported Wireless Standards

Standard	Parameter	Mode	Notes
IEEE 802.11g	54 Mbps (WLAN)	Full Access Point	2.4 GHz ISM
IEEE 802.11b	11 Mbps (WLAN)	Client support	Backwards compatibility
IEEE 802.11i	Strong Encryption	WPA2-AES (CCMP)	Robust Secure Network (RSN)
	Enhanced Encryption	WPA-TKIP (RC4)	Temporal keys
	Basic Encryption	WEP (RC4)	Up to 4 static keys
IEEE 802.1x	Wireless Authentication	Personal or Enterprise	PSK or RADIUS

Section 4.6.2
Radio Characteristics

Standard	Parameter
Modulation	Direct Sequence Spread Spectrum 802.11b/OFDM 802.11g
Frequency Range	2.4 Ghz to 2.4965 Ghz
Data Rate	6-54 Mbps: OFDM 11 Mbps: CCK 5.5 Mbps: CCK 2 Mbps: DQPSK 1 Mbps: DBPSK
Channels	11 - US (FCC) 11 - CAN (IC) 14 - Japan (MKK) 13 - Other countries (ETS)
Output Power	100 mW (20 dBm) 802.11b 11 Mbps Data Rate 100 mW (20 dBm) 802.11g 6-24 Mbps Data Rate 79 mW (19 dBm) 802.11g 36 Mbps Data Rate 63 mW (18 dBm) 802.11g 48 Mbps Data Rate 40 mW (16 dBm) 802.11g 54 Mbps Data Rate
Receiver Sensitivity	At Radio 802.11b 11 Mb @ -88 dBm/ With Antenna: 11 Mb @ -91 dBm At Radio 802.11g 54 Mb @ -74 dBm/ With Antenna: 54 Mb @ -77 dBm

Section 4.6.3
Channel Allocations for IEEE 802.11b/g

The following details the channel identifiers, channel center frequencies and regulatory domains of each IEEE 802.11b/g 22-MHz-wide channel:

NOTE
Mexico is included in the Rest of World regulatory domain. However, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for making sure the channel set configuration complies with the regulatory standards of Mexico.

Channel Identifier	Frequency(MHz)	Regulatory Domains			
		America (-A)	EMEA (-E)	Japan (-J)	Rest of World (-W)
1	2412	•	•	•	•
2	2417	•	•	•	•
3	2422	•	•	•	•
4	2427	•	•	•	•
5	2432	•	•	•	•

Channel Identifier	Frequency(MHz)	Regulatory Domains			
		America (-A)	EMEA (-E)	Japan (-J)	Rest of World (-W)
6	2437	•	•	•	•
7	2442	•	•	•	•
8	2447	•	•	•	•
9	2452	•	•	•	•
10	2457	•	•	•	•
11	2462	•	•	•	•
12	2467		•	•	•
13	2472		•	•	•
14[k]	2484			•	

[k] *Not supported in Japan for 802.11g mode.*

Section 4.7
Operating Environment

Parameter	Range	Comments
Ambient Operating Temperature	-40 to 85 °C (-40 to 185 °F)	Measured from a 30 cm (12 in) radius surrounding the center of the enclosure.
Ambient Relative Humidity	5% to 95%	Non-condensing
Ambient Storage Temperature	-40 to 85 °C (-40 to 185 °F)	

Section 4.8
Mechanical Specifications

Parameter	Value
Dimensions	Refer to Chapter 5, *Dimension Drawings*
Weight	1.2 kg (2.7 lbs)
Ingress Protection	IP40 (1 mm or 0.04 in objects)
Enclosure	20 AWG Galvanized Steel

5 Dimension Drawings

NOTE
All dimensions are in millimeters, unless otherwise stated.

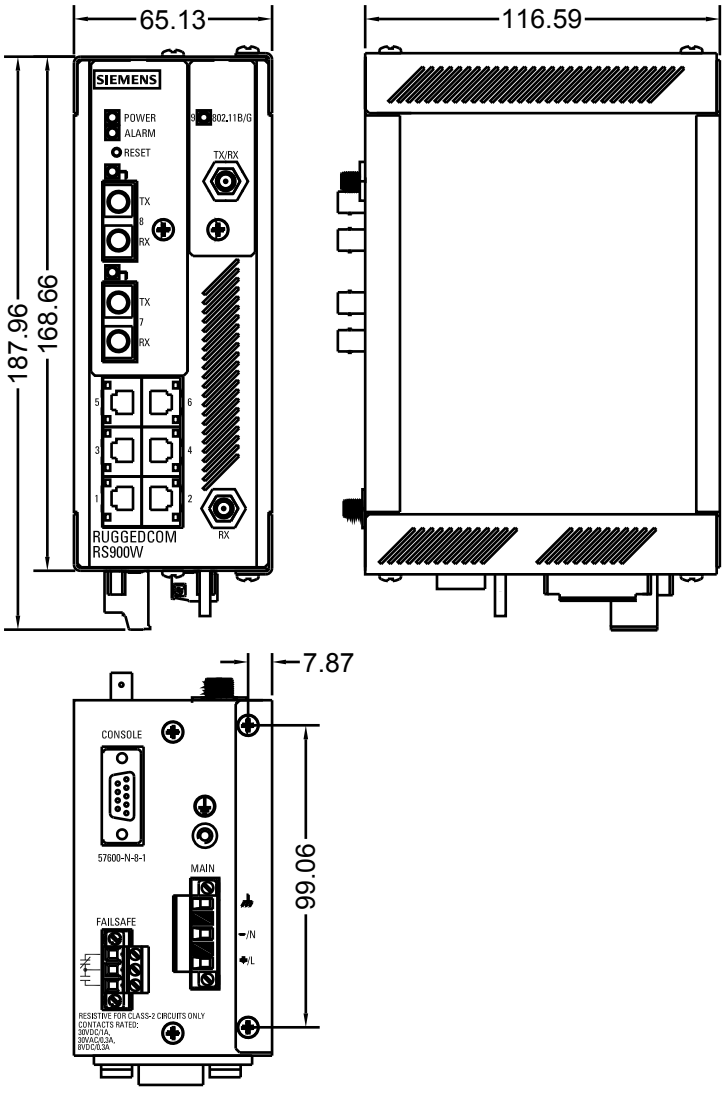

Figure 15: Overall Dimensions

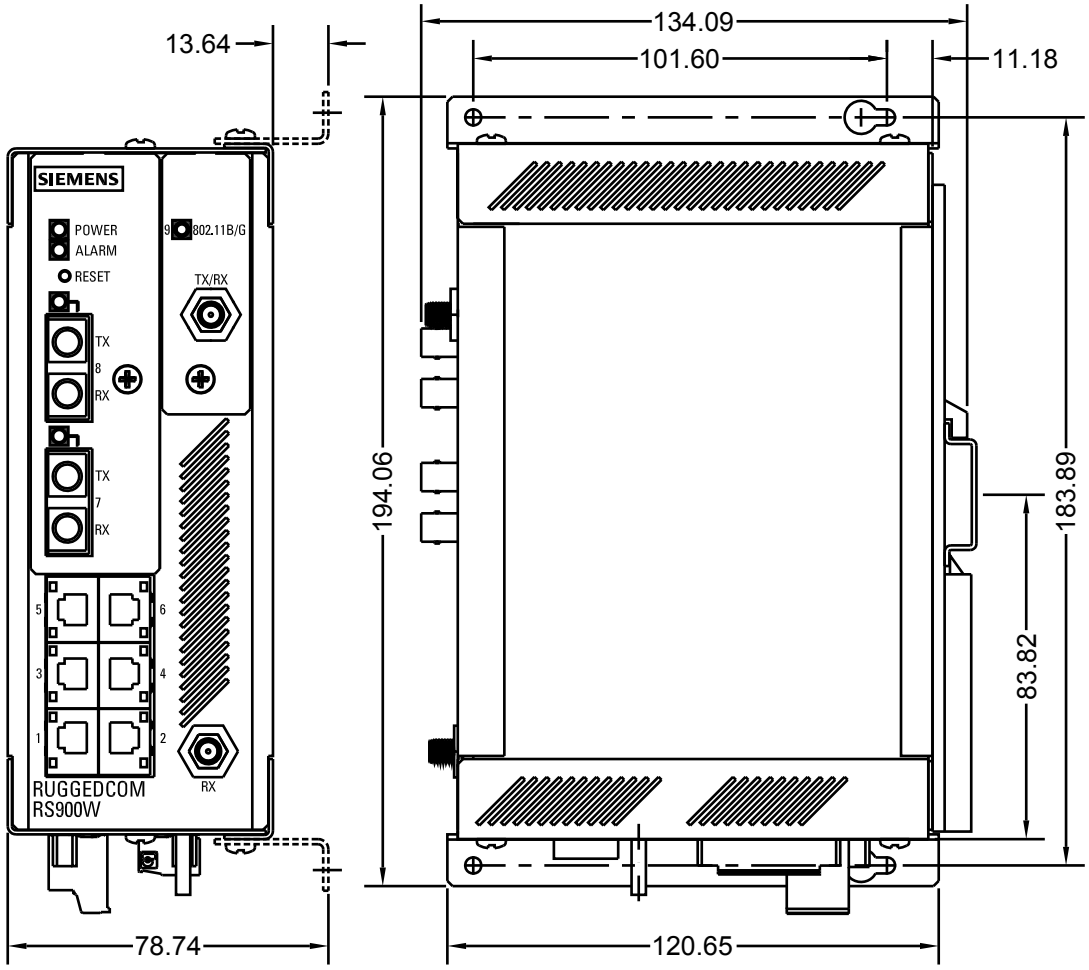

Figure 16: Panel and DIN Rail Mount Dimensions

6 Certification

The RS900W device has been thoroughly tested to guarantee its conformance with recognized standards and has received approval from recognized regulatory agencies.

- Section 6.1, “Agency Approvals”
- Section 6.2, “FCC Compliance”
- Section 6.3, “Industry Canada Compliance”
- Section 6.4, “EMI and Environmental Type Tests”

Section 6.1

Agency Approvals

Agency	Standards	Comments
CSA	CSA C22.2 No. 60950-1, UL 60950-1	Approved
CE	EN 60950-1, EN 61000-6-2, EN60825-1, EN55022 Class A, EN 50581, EN 301 489-1, EN 301 489-17 and EN 300 328-1	CE Compliance is claimed via Declaration of Self Conformity Route
FCC	FCC Part 15, Class A	Approved
	FCC Part 15, Sub-part C	Approved ID: VG5RW80G
Industry Canada	IC RSS-210	Approved ID: 4997A-VG5RW80G
FDA/CDRH	21 CFR Chapter I, Sub-chapter J	Approved

Section 6.2

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference on his own expense.

Section 6.3
Industry Canada Compliance

CAN ICES-3 (A) / NMB-3 (A)

Section 6.4
EMI and Environmental Type Tests

The RS900W has passed the following EMI and environmental tests.

IEC 61850-3 Type Tests

Test	Description		Test Levels	Severity Levels
IEC 61000-4-2	ESD	Enclosure Contact	+/- 8 kV	4
		Enclosure Air	+/- 15 kV	4
IEC 61000-4-3	Radiated RFI	Enclosure ports	20 V/m	x
IEC 61000-4-4	Burst (Fast Transient)	Signal ports	+/- 4 kV @ 2.5 kHz	x
		DC Power ports	+/- 4 kV	4
		AC Power ports	+/- 4 kV	4
		Earth ground ports	+/- 4 kV	4
IEC 61000-4-5	Surge	Signal ports	+/- 4 kV line-to-earth, +/- 2 kV line-to-line	4
		DC Power ports	+/- 2 kV line-to-earth, +/- 1 kV line-to-line	3
		AC Power ports	+/- 4 kV line-to-earth, +/- 2 kV line-to-line	4
IEC 61000-4-6	Induced (Conducted) RFI	Signal ports	10 V	3
		DC Power ports	10 V	3
		AC Power ports	10 V	3
		Earth ground ports	10 V	3
IEC 61000-4-8	Magnetic Field	Enclosure ports	40 A/m continuous, 1000 A/m for 1 s	
IEC 61000-4-29	Voltage Dips and Interrupts	DC Power ports	30% for 0.1 s, 60% for 0.1 s, 100% for 0.05 s	
		AC Power ports	30% for 1 period, 60% for 50 periods	
IEC 61000-4-11			100% for 5 periods, 100% for 50 periods	
IEC 61000-4-12	Damped Oscillatory	Signal ports	2.5 kV common, 1 kV differential mode @ 1 MHz	3

Test	Description		Test Levels	Severity Levels
		DC Power ports	2.5 kV common, 1 kV differential mode @ 1 MHz	3
		AC Power ports	2.5 kV common, 1 kV differential mode @ 1 MHz	3
IEC 61000-4-16	Mains Frequency Voltage	Signal ports	30 V Continuous, 300 V for 1 s	4
		DC Power ports	30 V Continuous, 300 V for 1 s	4
IEC 61000-4-17	Ripple on DC Power Supply	DC Power ports	10%	3
IEC 60255-5	Dielectric Strength	Signal ports	2 kVAC (Fail-Safe Relay output)	
		DC Power ports	1.5 kVDC	
		AC Power ports	2 kVDC	
	HV Impulse	Signal ports	5 kV (Fail-Safe Relay Output)	
		DC Power ports	5 kV	
		AC Power ports	5 kV	

IEEE 1613 (C37.90.x) EMI Immunity Type Tests

NOTE
The RS900W meets Class 2 requirements for an all-fiber configuration and Class 1 requirements for copper ports.

IEEE Test	IEEE 1613 Clause	Description		Test Levels
C37.90.3	9	ESD	Enclosure Contact	+/- 8 kV
			Enclosure Air	+/- 15 kV
C37.90.2	8	Radiated RFI	Enclosure ports	35 V/m
C37.90.1	7	Fast Transient	Signal ports	+/- 4 kV @ 2.5 kHz
			DC Power ports	+/- 4 kV
			AC Power ports	+/- 4 kV
			Earth ground ports	+/- 4 kV
		Oscillatory	Signal ports	2.5 kV common mode @ 1MHz
			DC Power ports	2.5 kV common and differential mode @ 1MHz
			AC Power ports	2.5 kV common and differential mode @ 1MHz
C37.90	6	HV Impulse	Signal ports	5 kV (Failsafe Relay)
			DC Power ports	5 kV
			AC Power ports	5 kV
		Dielectric Strength	Signal ports	2 kVAC (Failsafe Relay)
			DC Power ports	1.5 kVDC

IEEE Test	IEEE 1613 Clause	Description		Test Levels
			AC Power ports	2 kVAC

Environmental Type Tests

Test	Description		Test Levels	Severity Levels
IEC 60068-2-1	Cold Temperature	Test Ad	-40 °C (-40 °F), 16 Hours	
IEC 60068-2-2	Dry Heat	Test Bd	85 °C (185 °F), 16 Hours	
IEC 60068-2-30	Humidity (Damp Heat, Cyclic)	Test Db	95% (non-condensing), 55 °C (131 °F), 6 cycles	
IEC 60255-21-1	Vibration		2 g @ 10-150 Hz	Class 2
IEC 60255-21-2	Shock		30 g @ 11 ms	Class 2